High-energy and Low-Energy Power Operator Overview:

Power operators fall under two primary classifications—high-energy and low-energy. High-energy operators are typically used in commercial/retail applications where the goal is to move people through the door quickly so that traffic flow is unimpeded by the action of the door. This type of power operator moves doors at a high rate of speed, generating substantial kinetic energy. As such, these operators require several safety systems, including sensors or mats, guide rails, and finger protection.

In contrast, low-energy operators, move the door slowly at a rate considered intrinsically safe since the kinetic energy generated by the movement of the door should be lower than that which could injure the average person on impact. Low-energy operators do not require any additional safety.

The low energy standard—referenced by *ADA*—is American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA) A 156.19, *American National Standard for Power Assist and Low-energy Power Operated Doors*. The full-energy standard is ANSI/BHMA A 156.10, *American National Standard for Power Operated Pedestrian Doors.* The focus of this document relates to *ADA* and low-energy power operators.

Operator Type	Safety Equipment Required to be BHMA Compliant	Common Applications
Low Energy	Signage (included with unit)	(Low to Moderate Traffic) Executive Offices, ADA Dorm Rooms, ADA Hotels, Retirement Homes, Educational or Assisted Living Facilities, Office/Warehouse Corridor Doors, ADA Auxiliary Entrances, ADA Accessible Restrooms, Fire Doors
High Energy	Guide Rails, Safety Mats, Sensors & Signage	(High Traffic) Hospital Emergency Entrances & Operating Rooms, Airport Entrances, Large Office Building or Department Store Entrances

The following pages contain pertinent details, information and requirements for both high-energy and low-energy power operators. You'll notice that low-energy power operators have fewer requirements than high-energy power operators. The following pages will give you a good idea of what is required for each of these types of power operators.

Low Energy Power Operated Doors ANSI 156.19 Compliance Overview

- Activation requires a knowing act (for example: pushing a wall switch or using a card reader) to start the automatic opening cycle
- Operators for ADA are allowed on 32” to 48” Wide Doors
- Operator in motion may not exceed 15lbs min. kinetic opening or closing force
- Operator must open at 3 sec. max to 80º or Back Check; whichever comes first
- Operator min. Hold Open time = 5 sec.
- Operator must close from 90º to 10º in 3 sec. max
- Kinetic Motion may not exceed 1.25 lbs. ft. max
- Manual opening force not to exceed 15lbs.
- ANSI 156.10 recommends that actuators are mounted 1’ to 5’ from operator &12’ max distance
- Actuator height 42” CL from FF common; however, they may be located between 34” and 48”
  - Low Energy Power Open Door
    - Not associated with electricity (versus high energy opener)
    - Door speed is slower when opening
    - No safety equipment such as rails or sensors are required
    - Uses motor to open and mechanical closer to close
    - Not required by ADA but contributes to greater accessibility
  - Meets ANSI specification A156.19
  - UL Listed for fire and smoke check doors -UL 10C and UBC 7.2 for positive pressure

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Automatic doors and operators can cause serious injury or death, when not correctly and safely adjusted and maintained. TO PREVENT SERIOUS INJURY OR DEATH ONLY AAADM CERTIFIED AND QUALIFIED SERVICE TECHNICIANS SHOULD REPAIR, ADJUST OR MAINTAIN AUTOMATIC DOORS.

High Energy Power Operated Doors ANSI 156.10 Compliance Overview

Quick Reference:
- General Information - A156.10 ¦ Sensing Devices - Swing Doors
- Sensing Devices - Sliding Doors ¦ Safety Detection Zones - Swing Doors
- Guide Rails - Swing Doors ¦ Decals and Markings - Swing Doors
- Decals and Markings - Sliding Doors ¦ Entrapment Protection - Swinging Doors
- Entrapment Protection - Sliding Doors

General Information - A156.10
Compliance with American National Standard A156.10 and A156.19 is intended to reduce the chance of injury to pedestrians and wheeled traffic. Most all local codes, such as BOCA, require compliance with A156.10 if automatic doors or door operators are used. ANSI states that these are suggested standards, but compliance is required when local building codes incorporate A156.10.

Sensing Devices - Swing Doors

- Activation area (of door opening actuation device) shall be at least as wide as the door opening, measured at a distance of 30" (762 mm) from the face of the door when it is in the full closed position.
- Activation area shall be a minimum of 48" (1219 mm) measured from the center of the door opening (threshold).
- The actuation sensing device shall detect a person at least 28" (711 mm) tall and moving at a rate of speed not slower than 6" (152 mm) per second and perpendicular to the door.
- The actuation sensing device shall maintain a door open signal for a minimum of 1.5 seconds, after the user leaves the detection pattern.
- If a swinging door is used for two-way traffic, the safety sensing device must extend at least 5" (127 mm) past the edge of the door in the full open position. The actuation sensing device on the swing side of the door must extended at least an additional 55" (1397 mm) from the edge of the door in the full open position.

Sensing Devices - Sliding Doors

- Activation area (of door opening actuation device) shall be at least as wide as the door opening, measured at a distance of 30" (762 mm) from the face of the door when it is in the full closed position.
- Activation area shall be a minimum of 54" (1372 mm) measured from the center of the door opening (threshold).
- The actuation sensing device shall detect a person at least 28" (711 mm) tall and moving at a rate of speed not slower than 6" (152 mm) per second and perpendicular to the door.
- The actuation sensing device shall maintain a door open signal for a minimum of 1.5 seconds, after the user leaves the detection pattern.
- A presence sensing device shall be present in the door's threshold area to prevent the door from closing on a person as follows:

Option One: Provide four photo beams, two per each side of the sliding door panel(s) installed within 3" of the centerline

Option Two: Provide an overhead mounted threshold presence sensor on one side of the sliding door panel(s) and two photo beams on the opposite side.

Option Three: Provide an overhead mounted threshold presence sensor on both sides of the sliding door panel(s).

Safety Detection Zones - Swing Doors

- A safety detection device must be provided on the swing side of all power operated swing doors.
- Door must remain open for a minimum of 1.5 seconds, after the safety hold open device's detection zone is clear of traffic.
- If a non-mat actuation sensing device is used to open the door in combination with floor mounted safety mats, the safety mat must extended must extend a minimum of 5" (127 mm) past the edge of the door in the full open position. The door must also have either a) safety mat extending a minimum of 5" (127 mm) through the threshold measured from the face of the door opposite the swing side; or b) safety sensing device that will prevent a fully open door from closing on a person; or c) the door shall remain open for a minimum of 4 seconds, after the door open signal is removed.
- Safety control mats if used must be at least as wide as the door frame opening less 5" (127 mm) on each side. The active area of the safety mat must not be more than 5" (127 mm) from the door's jambs.
- Matless safety sensing devices must have a detection zone extending at least 5" (127 mm) past the edge of a fully open door.
- The safety zone must be at least as wide as the door opening less 5" (127 mm) on each side.
- If matless sensing devices are used for both actuation and safety, a 6" (152 mm) maximum inactive area is permitted centered in the door's threshold, but must include a) safety mat extending a minimum of 5" (127 mm) through the threshold measured from the face of the door opposite the swing side; or b) safety sensing device that will prevent a fully open door from closing on a person; or c) the door shall remain open for a minimum of 4 seconds, after the door open signal is removed.

Guide Rails- Swing Doors

- Two guide rails must be installed on the swing side of each door, unless a wall or other separation device is used in place of a guide rail.
- The guide rails must extended from the face of the door jamb a distance at least equivalent to the widest door leaf width.
- Guide rails used on swing doors for two-way traffic must extend from the face of the door jamb to at least 60" (1524 mm) past the edge of the widest door leaf in the full open position.
- Guide rails must be at least 30" (762 mm) high.
- Guide rails must have a panel or a divider bar.
- Not more than a 6" (152 mm) gap is allowed between the rail and the leading edge of the door's travel arc.
- Not more than a 6" (152 mm) or less than a 2" (51 mm) gap is allowed between the face of a fully opened door and the guide rail.
- Gaps between the door's jamb and a free standing rail must not exceed 2" (51 mm).

Decals and Markings - Swing Doors

- A decal or sign with an arrow must be visible from the approach side of the door. The arrow sign must be at least 6" (152 mm) in diameter, with a green circle surrounding a black arrow with a white background.
- A decal or sign with an international bar entry symbol and the words "DO NOT ENTER" must be visible on the swing side of the door. The sign must be a minimum of 6" (152 mm) in diameter. The sign must be red, with wording and markings in white.
- Two-way traffic swing doors must have a decal or sign with the words "AUTOMATIC CAUTION DOOR" The sign shall be a minimum of 6" (152 mm) in diameter and yellow with black lettering and markings.
- The center of signs must be mounted between 53" (1346 mm) and 63" (1600 mm) above the finished floor.
- All swinging doors must have signs or decals reading " AUTOMATIC DOOR" with at least ½" (13 mm) high lettering.

Decals and Markings - Sliding Doors

- Sliding doors with emergency egress swing-out door panels must have signs or decal on the egress side reading "IN EMERGENCY PUSH TO OPEN". The background must be red with at least 1" (26 mm) high contrasting lettering.
- All Sliding doors must have signs or decals reading " AUTOMATIC DOOR" with at least ½" (13 mm) high lettering.

Entrapment Protection - Swinging Doors

- Not more than 40 lbf (180 N) shall be required to prevent a stopped swinging door from moving to the closed position. Forces must be measured 1" (25 mm) from the latch edge of the door panel.
- A swinging door must not open to back check (not less than 80 degrees) in less than 1.5 seconds.
- Not more than 40 lbf (180 N) shall be required to prevent a stopped swinging door from moving, during its last 10 degrees of opening. Forces must be measured 1" (25 mm) from the latch edge of the door panel.
- A swinging door must not complete travel through its last 10 degrees of opening in less than 1.5 seconds.
- Swinging doors must not close to latch check (10 degrees) in less than 2.3 seconds for a 36" (915 mm) door weighing up to 140 lbs. (64 Kg), 2.7 seconds for a 42" (1067) door weighing up to 150 lbs. (68 Kg), or 3.2 seconds for a 48" (1219) door weighing up to 160 lbs. (73 Kg). For other door sizes multiply the square root of the door's weight in pounds by the width of the door in inches. Divide the total by 188 and you will get minimum closing time in seconds.
- Automatic swinging doors must be provided with fingerguards preventing digit entrapment between the back edge of the door and the door's jamb.
- Manual opening force for automatic swing doors must not exceed 50 lbs. (222 N), measured 1" (26 mm) from the latch edge of the door.
- Inswinging automatic doors used for emergency egress must swing toward the direction of egress with not more than 50 lbs. (222 N), measured 1" (26 mm) from the latch edge of the door. The door's operator, excluding spring power, must be disabled when the door is in the panic breakout mode.

Entrapment Protection - Sliding Doors

- Not more than 30 lbf (133 N) shall be required to prevent a stopped sliding door from moving to the closed position, during any point of its closing travel.
- Closing speed to latch check (not less than 2" (51 mm) from fully closed) must not exceed 1 foot per second for doors weighing up to 160 lbs. (71 Kg) per door leaf. For doors over 160 lbs. (71 Kg), maximum velocity in ft/second is equal to the square root of 161 divided by the weight of the door in pounds, as illustrated below.
- Sliding doors used for emergency egress must swing out toward the direction of egress with not more than 50 lbs. (222 N), measured 1" (26 mm) from the latch edge of the door.
- If the door's sliding panels and stationary sidelights breakout for emergency egress, the door's operator must be disabled when the door is in the panic breakout mode. If the sliding doors breakout and the stationary sidelights do not, a spring closing device may be provided in lieu of or in addition to the disabling of the door's operator.

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